### **APPENDIX I**

# REFERENCES USED TO DEVELOP THE TRAMAN

Although the following references were current when this TRAMAN was published, their continued currency cannot be assured. When consulting these references, keep in mind that they may have been revised to reflect new technology or revised methods, practices, or procedures. You therefore need to ensure that you are studying the latest references.

- Code of Federal Regulation, Title 29, Part 1926; Title 40, Parts 122 and 260-267; U. S. Government Printing Office, Washington, DC, 1997.
- Department of the Navy Facility Category Codes, NAVFAC P--72, Naval Facilities Engineering Command, Alexandria, VA, 1984.
- Environmental and Natural Resources Program Manual, OPNAVINST 5090.1 B, Chief of Naval Operations, Washington, DC, 1994.
- Facilities Planning Guide, Volumes 1 and 2, NAVFAC P-437, Naval Facilities Engineering Command, Alexandria, VA, 1990.
- Facilities Projects Manual, OPNAVINST 11010.20F, Chief of Naval Operations, Washington. DC, 1996.
- Hazardous Material Control and Management (HMC&M), OPNAVINST 5090.1B, Chief of Naval Operations, Washington, DC, 1989.
- Mishap Investigation and Reporting, OPNAVINST 5102.1C, Chief of Naval Operations, Washington, DC, 1989.
- Naval Construction Force Occupational Safety and Health Program Manual, COMSECOND/COMTHIRDNCBINST 5100.1, Commander, Naval Construction Battalions, U.S. Pacific Fleet, Pearl Harbor, HI, and Commander, Naval Construction Battalions, U.S. Atlantic Fleet, Norfolk, VA, 1996.
- Naval Mobile Construction Battalion Operations Officer's Handbook COMSECOND/COMTHIRDNCBINST 5200.2A, 1989.
- Operation and Organizational Maintenance Manual, NAVFAC P-8-628-12, Naval Facilities Engineering Command, Alexandria, VA, 1984.
- Procurement. Lease, and Use of Relocatable Buildings, OPNAVINST 11010.33B, Chief of Naval Operations, Washington, DC, 1988.
- Seabee Crewleader's Handbook, The Civil Engineer Corps Officer's School (CECOS) CBC, Port Hueneme, CA, 1997.
- Seabee Planner's and Estimator's Handbook, NAVFAC P-405, Naval Facilities Engineering Command, Alexandria, VA, 1994.
- Table of Advanced Base Functional Components with Abridged Initial Outfitting List, OPNAV 41P3C, Chief of Naval Operations, Washington, DC, 1996.

- Blueprint Reading and Sketching, NAVEDTRA 12014, Naval Education and Training Program Management Support Activity\*, Pensacola, FL, 1994.
- Policy and Procedures for Project Drawing and Specification Preparation MIL-HDBK-1006/1A, Chesapeake Division, Naval Facilities Engineering Command, Washington DC, 1995.
- Putnam, Robert, Construction Blueprint Reading, Englewood Cliffs, NJ, 1985.

#### Chapter 3

- Croft, Terrell and Wilford I. Summers, *American Electrician's Handbook*, 12th ed., McGraw-Hill, New York, 1992.
- Electric Power Distribution Systems Operations, NAVFAC MO-201, Naval Facilities Engineering Command, Alexandria, VA, 1990.
- Electric Power Supply and Distribution, TM-5-811-1/AFM 88-9, Chapter 1, Department of the Army and Air Force, Washington, DC, 1984.
- Facilities Engineering-Electrical Exterior Facilities, NAVFAC MO-200, Naval Facilities Engineering Command, Alexandria, VA, 1979.
- Generator Set, Diesel Engine Drive, Tactical Skid Mount, NAVFAC P-8-628-12, Naval Facilities Engineering Command, Alexandria, VA, 1984.
- Introduction to Alternating Current and Transformers, Navy Electricity and Electronics Training Series, Module 2, NAVEDTRA 172-02-00-91, Naval Education and Training Program Management Support Activity, Pensacola, FL, 1991.
- Introduction to Solid-State Devices and Power Supplies, Navy Electricity and Electronics Training Series, Module 7, NAVEDTRA, 172-07-00-92, Naval Education and Training Program Management Support Activity, Pensacola, FL, 1992.
- McPortland, J. F., and Brian J. McPortland, *National Electrical Code*<sup>®</sup> *Handbook*, 22nd ed., McGraw-Hill, New York, 1996.
- National Electrical Code<sup>®</sup>, National Fire Protection Association, Quincy, MA, 1996.

- Application Guide for Capacitance Current Switching of AC High- Voltage Circuit Breakers Rated on a Symmetrical Current Basis, American National Standard Institute, Inc., ANSI C37.012-1979(R1989), The Institute of Electrical and Electronics Engineers, Inc., New York.
- Electric Power Distribution Systems Operations, NAVFAC MO-201, Naval Facilities Engineering Command, Alexandria, VA, 1990.
- Electric Power Supply and Distribution, TM-5-811-1/AFM 88-9, Chapter 1, Department of the Army and Air Force, Washington, DC, 1984.
- *IEEE Guide for Protection of Shunt Capacitor Banks*, American National Standard Institute, Inc., ANSI C37.99, The Institute of Electrical and Electronics Engineers, Inc., New York, 1990.

- Introduction to Alternating Current and Transformers, Navy Electricity and Electronics Training Series, Module 2, NAVEDTRA 172-02-00-91, Naval Education and Training Program Management Support Activity, Pensacola, FL, 1991.
- Introduction to Solid-State Devices and Power Supplies, Navy Electricity and Electronics Training Series, Module 7, NAVEDTRA, 172-07-00-92, Naval Education and Training Program Management Support Activity, Pensacola, FL, 1992.
- Kurtz, Edwin B., and Thomas M. Shoemaker, *The Lineman's and Cableman's Handbook*, 8th ed., McGraw-Hill, New York, 1996.
- McPortland, J. F., and Brian J. McPortland, *National Electrical Code*<sup>®</sup> *Handbook*, 22nd ed., McGraw-Hill, New York, 1996.
- National Electrical Code<sup>®</sup>, National Fire Protection Association, Quincy, MA, 1996.
- Protective Headwear for Industrial Worker-Requirements, American National Standard Institute, Inc., ANSI 289.1, New York, 1986.
- Rubber Insulating Blankets, American National Standard Institute, Inc., and American Society for Testing and Materials, ANSI/ASTM D1048-88, Philadelphia, 1988.
- Rubber Insulating Gloves, American National Standard Institute, Inc., and American Society for Testing and Materials, ANSI/ASTM D120, Philadelphia, 1995.
- Rubber Insulating Line Hose, American National Standard Institute, Inc., and American Society for Testing and Materials, ANSI/ASTM D1050-90, Philadelphia, 1990.
- Specifications and Dimensions of Wood Poles, American National Standard Institute, Inc., ANSI O5.1, The Institute of Electrical and Electronics Engineers, Inc., New York, 1992.

- Croft, Terrell and Wilford I. Summers, *American Electrician's Handbook*, 12th ed., McGraw-Hill, New York, 1992.
- Fink, Donald G., and H. Wayne Beaty, *Standard Handbook for Electrical Engineers*, 13th ed., McGraw-Hill, New York, 1993.
- Introduction to Alternating Current and Transformers, Navy Electricity and Electronics Training Series, Module 2, NAVEDTRA 172-02-00-91, Naval Education and Training Program Management Support Activity, Pensacola, FL, 1991.
- McPortland, J. F., and Brian J. McPortland, *National Electrical Code*<sup>®</sup> *Handbook*, 22nd ed., McGraw-Hill, New York, 1996.
- National Electrical Code<sup>®</sup>, National Fire Protection Association, Quincy, MA, 1996.

- AM-2 Airfield Landing Mat and Accessories, NAVAIR 51-60A-1, Naval Air Systems Command, Washington, DC, 1996.
- Definitive Designs for Naval Shore Facilities, NAVFAC P-272, Naval Facilities Engineering Command, Alexandria, VA, 1988.
- Department of the Navy Physical Security and Loss Prevention, OPNAVINST 5530.14B. Chief of Naval Operations, Washington, DC. 1988.
- Expeditionary Airfields, NAVAIR 51-35-7, Naval Air Systems Command, Washington, DC. 1984.
- Facilities Engineering-Electrical Exterior Facilities, NAVFAC MO-200, Naval Facilities Engineering Command, Alexandria, VA, 1979.
- General Requirements for Shorebased Airfield Marking and Lighting, NAVAIR 51-50AAA-2, Naval Air Systems Command, Washington, DC, 1990.
- Informational Guide for Roadway Lighting, American Association of State Highway and Transportation Officials, Washington, DC.
- Introduction to Fiber Optics, Navy Electricity and Electronics Training Series, Module 24, NAVEDTRA B72-24-00-92, Naval Educational Training Program Management Support Activity, Pensacola, FL, 1992.
- Lighting and Marking Systems for Expeditionary Airfields, NAVAIR 51-40ABA-7, Naval Air Systems Command, Washington, DC, 1992.
- McPortland, J. F., and Brian J. McPortland, *National Electrical Code* Handbook, 32nd ed., McGraw-Hill, New York, 1996.
- National Electrical Code<sup>®</sup>. National Fire Protection Association, Quincy, MA, 1996
- Standard Practice for Roadway Lighting, American National Standard Institute, Inc.. Illuminating Engineering Society, ANSI/IES RP8-1983(R1993), New York.

- Alerich, Walter N., *Electric Motor Control*, 5th ed., Delmar Publishers Inc., Albany, NY, 1993.
- Code of Federal Regulation, Title 29, Part 1926, U. S. Government Printing Office, Washington, DC, 1997.
- Croft, Terrell and Wilford I. Summers, *American Electrician's Handbook*, 12th ed., McGraw-Hill, New York, 1992.
- Fink, Donald G., and H. Wayne Beaty, *Standard Handbook for Electrical Engineers*, 13th ed., McGraw-Hill, New York, 1993.
- Introduction to Solid-Stare Devices and Power Supplies, Navy Electricity and Electronics Training Series, Module 7, NAVEDTRA, 172-07-00-92, Naval Education and Training Program Management Support Activity, Pensacola, FL: 1992.
- McPortland. J. F., and Brian J. McPortland, *National Electrical Code* Handbook, 22nd ed., McGraw-Hill. New York, 1996.

- National Electrical Code<sup>®</sup>, National Fire Protection Association, Quincy, MA, 1996.
- Navy Occupational Safety and Health (NAVOSH) Program Manual, OPNAVINST 5100.23D, Chief of Naval Operations, Washington, DC, 1994.
- Rosenberg, Robert and August Hand, *Electric Motor Repair*, 3d ed., Saunders College Publishing, Fort Worth, TX, 1987.

- Commercial Intrusion Detection Systems (IDS)DM.13.02, SN 0525-LP-64-6625, Naval Facilities Engineering Command, Alexandria, VA, 1986.
- Introduction to Solid-State Devices and Power Supplies, Navy Electricity and Electronics Training Series, Module 7, NAVEDTRA, 172-07-00-92, Naval Education and Training Program Management Support Activity, Pensacola, FL, 1992.
- Maintenance of Fire Protection Systems, NAVFAC MO-117, Naval Facilities Engineering Command, Alexandria, VA, 1989.
- McPortland, J. F., and Brian J. McPortland, *National Electrical Code*® *Handbook*, 22nd ed., McGraw-Hill, New York, 1996.
- National Electrical Code<sup>®</sup>, National Fire Protection Association, Quincy, MA, 1996.
- Traister, John E., *Design and Application of Security/Fire-Alarm Systems*, McGraw-Hill, New York, 1990.

<sup>\*</sup> Effective 01 October 1996, the Naval Education and Training Program Management Support Activity (NETPMSA) became the Naval Education and Training Professional Development and Technology Center (NETPDTC).

## **INDEX**

A	Construction drawings-Continued			
	as-built drawings, 2-4			
Advanced Base Functional Components (ABFC)	blueprint language, 2-4			
assembly 32602, 1-5	dimensions, metric, 2-13			
component P-25, 1-3	dimensions, modular, 2-12			
facility 811 10R, 1-5	lines, types and weights, 2-4			
index of facilities, 1-5	scale representation, 2-6			
NAVFAC P-437, 1-1, 1-2	schedules, 2-6			
OPNAV 41P3, 1-1	working sketches, 2-4			
ordering, 1-5	Control circuits			
Airfield lighting, 6-28	control symbols, 7-12			
circuits, 6-33	general, 7-11			
condenser discharge system, 6-40	Controllers			
fixtures and lamps, 6-39	combination starters, 7-18			
layout. 6-28	push-button-station connections, 7-18			
systems, 6-28	start-stop station with a pilot light, 7-19			
vault, 6-30	testing component circuits, 7-17			
Airfield lighting systems, maintenance, 6-47	troubleshooting, 7-16			
routine, 6-47				
troubleshooting circuits, 6-48	_			
Alarm systems, 8-1	D			
components, 8-9				
components, commercial/industrial 8-15	Drawings and specifications, definitions, 2-1			
control panel, 8-10	Drawings, construction, see Construction			
entry detectors, 8-12	drawings			
equipment operation, new techniques, 8-6				
fire-alarm systems, 8-1	E			
installation, basic, 8-2				
installation in existing buildings, 8-4	Electrical distribution systems configuration, 4-1			
installation in existing buildings, new techniques,	loop/ring, 4-1			
8-6	network, 4-2			
installation techniques, 8-1	primary selective, 4-3			
NEC® requirements, 8-2	radial, 4-1			
power supplies, 8-10	Electrical distribution systems maintenance,			
techniques, new, practical application, 8-6	4-33			
Area lighting systems, see Lighting, area	digital multimeters, 4-34			
systems	interference elimination, 4-35			
As-built drawings, see Construction drawings	maintenance of distribution			
	equipment, 4-35			
C	measuring instrument precautions, 4-33			
	safety equipment, 4-36			
Circuits, motor branch, see Motor branch	Electrical distribution systems overhead			
Conduit, bending, 5-15	considerations			
functions and safety, 5-15	equipment, 4-4			
power benders, 5-15	capacitors, 4-15			
Conduit, supports and installation, 5-1 8	poles, 4-4			
hangers and supports, 5-19	protective/interrupting devices, 4-20			
location of supports, 5-18	transformers, 4-5			
Construction drawings, 2-2	pole locations, 4-3			
abbreviations and symbols, 2-5	protective grounds, 4-25			

Electrical distribution systems underground considerations	Floodlights, 6-17 aiming, 6-20
cable installation, 4-33	•
communication cables, 4-31	intensity calculations. 6-25
dangerous gases, 4-33	isofootcandle diagrams. 6-23 luminaires, selection of. 6-18
ducts and trenches, 4-29	maintenance factor, 6-35
manholes, 4-26	manufacturer's literature. 6-22
power cables, 4-31	mounting height and spacing. 6-19
pulling cable, 4-31	utilization graph. 6-25
rigging, 4-32	utilization graph. 0-25
risers and potheads, 4-30	_
Electrical safety, 5-24	G
clothing and protective equipment, 5-27	Congretors see Power generation
fuses, 5-25	Generators, see Power generation Grounding equipment, see Equipment grounding
out-of-service protection, 5-26	Grounding equipment, see Equipment grounding
portable electric tools, 5-25	Н
safety color codes, 5-27	Hezardous metarial 1.15
shock, 5-25	Hazardous material, 1-15
Emergency/standby power, 3-1	I
generating plant operations, 3-6	Interior 12 - 1 - 1 - 1 - 5 4
generator installation, 3-4	Interior wiring above grade, 5-4
generator selection, 3-1	branch circuits for grouped loads. 5-8
power plant maintenance, 3-11	building wiring, 5-5
system design, 3-1	conductors, 5-8
Equipment grounding	conduit layout, 5-4
fixed, 7-7	general provisions. 5-5
grounded circuit conductor, use of, 7-8	grounding, 5-5 individual branch circuits, 5-8
methods, 7-7	
Equipment troubleshooting, 7-24	lighting and appliance branch circuit panelboards.  5-6
Excavations and shoring	lighting and power systems, 5-6
excavations, 1-6	motor branch circuits, 5-8
shoring, 1-6	raceway system provisions, 5-5
-	services and feeders, 5-6
F	Interior wiring below grade, 5-1
Fiber-optic measurements, 6-5	markings, 5-1
field measurements, 6-5	underfloor raceway systems, 5-3
optical time domain reflectometry, 6-5	wet and corrosive installations. 5-1
Fiber-optic receivers, see Optical detectors	wet and corrosive instantations. 5 1
Fiber-optic system installation, 6-4	L
Fiber-optic system topology, 6-4	Lighting. airfield, see Airfield lighting
Fiber-optical splices, mechanical and fusion 6-6	Lighting, area systems, 6-9
fusion, 6-8	intensity, 6-9
glass or ceramic alignment tube, 6-6	intensity calculations. 6-15
multifiber, 6-8	luminaires, selection of, 6-10
rotary, 6-8	manufacturer's literature. 6-12
v-grooved, 6-7	mounting height and spacing. 6-10
Fiber optics, 6-1	street and area classifications, 6-9
optical source properties, 6-1	Lighting, security, see Security lighting
semiconductor LEDs and LDs, 6-1	Lighting, seeding, see seeding lighting
semiconductor material, 6-2	M
transmitters, 6-2	141
Fire safety, 5-27	Motor-branch circuits, 7-1
Fire-alarm systems, see Alarm systems	disconnecting means. motors, and controllers, 7-5

Motor-branch circuits-Continued	Q		
controllers, 7-5	· ·		
fuses for motor-overload protection, 7-6	Quality control		
motor controller protection, 7-4	quality control plan, 1-15		
motor-feeder short-circuit and ground-fault	resident officer in charge of		
protection, 7-3	construction (ROICC), 1-15		
overload devices, 7-7			
overload protection, 7-6	S		
protection of live parts. 7-7			
several motors or loads, 7-3	Safety, electrical, see Electrical safety		
short-circuit and ground-fault	Safety, fire, see Fire safety		
protection, 7-1	Security lighting, 6-26		
thermally protected motors, 7-7	alternate power sources, 6-27		
Motor maintenance, 7-19	area classification, 6-27		
brush inspection, 7-23	control, 6-27		
cleaning, 7-23	Soldering and splicing, 5-20		
commutator inspection, 7-23	solderless connectors, 5-20		
lubrication, 7-19	splices, 5-21		
periodic inspection, 7-22	Specifications, 2-2		
records, 7-23	Splices, see Fiber-optical splices		
storage, 7-22	_		
Motor start-up, 7-23	T		
0	Testing electrical circuits, 5-10		
Optical detectors and fiber-optic receivers, 6-3	circuit breakers and fuses, 5-12		
Optical fiber splices, see Fiber-optical splices	defective receptacle, 5-10		
Optical floci splices, see Ploci-optical splices	defective switch, 5-10		
P	ground terminal, 5-12		
•	hot wire, 5-11		
Power generation, 3-1	Timekeeping, 1-13		
Project planning, 1-7	crew supervisor's report, 1-14		
network analysis, 1-12	labor accounting system, 1-14		
project planning package, 1-9	reporting, 1-14		